390.1. DESCRIPTION

This work consists of removal of sealant from transverse contraction joints, repair of spalled areas, sawing, cleaning, and resealing joints.

390.2. MATERIALS

A. Bonding Mortar for Concrete Patches:

1. **Cement:** Cement shall conform to Section 750.

2. **Water:** Water shall conform to Section 790.

3. **Sand:** Sand shall conform to Section 810.1.

4. **Proportioning:** Bonding mortar shall be mixed in the following proportions by volume:

   1 part Portland Cement.
   1 part Sand.
   1/2 part Water, as necessary for a thick creamy consistency.

B. Concrete Patches:

1. **Cement:** Cement shall be Type III conforming to Section 750.

2. **Air Entraining Admixtures:** Air entraining admixtures shall conform to Section 751.

3. **Water:** Water shall conform to Section 790.

4. **Fine Aggregate:** Fine aggregate shall conform to Section 800.

5. **Coarse Aggregate:** Coarse aggregate shall be crushed quarry stone, size five, conforming to Section 820.

6. **Curing Compound:** Curing compound shall conform to Section 821.

7. **Proportioning:** Materials for concrete patches shall be mixed at the following proportions

   Fine Aggregate..……..165 lbs./bag (75 kg/bag) cement
   Coarse Aggregate……165 lbs./bag (75 kg/bag) cement
   Cement (min)……. 8.0 bags/c. y.(10.5 bags/cubic meter) concrete
   Water (maximum)……..5.0 gallon/bag (19 L/bag) cement

8. **Air and Slump:** The slump and air shall conform to the following:

   Air……7% $\pm$ 2%
   Slump……...1-1/2" (40 mm) maximum

C. Epoxy Resin Mortar:

1. Sand: Sand shall conform to Section 810.2.

2. Epoxy Resin: The epoxy resin adhesive shall conform to AASHTO M 235, Type III, Grade 2.

3. Proportioning: Proportioning shall be as recommended by the manufacturer.

D. Silicone Sealant: Silicone sealant shall conform to Section 870.1 B

390.3. CONSTRUCTION REQUIREMENTS

A. General: Joints on which seal removal or spall repair has begun shall be completed and sealed during the same construction season. Seal removal or spall repair will not be permitted after October 15. Sealing will not be permitted when the ambient air or pavement temperature falls below 40° F (4° C). The pavement shall be dry when placing the concrete patch. In place sealant shall be removed from transverse joints prior to spall removal.

Spalled areas greater than ½ inch (13 mm) deep at the joint shall be removed and repaired. When both Type A and Type B spalls are shown on the plans, Type A spalls are over 0.2 foot (60 mm) wide, and Type B are spalls 0.2 foot (60 mm) wide or less and greater than 0.06 foot (18 mm) wide. Spalls less than 0.06 foot (18 mm) wide shall be filled with silicone sealant when filling the joints.

B. Type A Spalls: Edges of areas to be repaired shall be sawed to a depth necessary, minimum of 1-1/2 inch (38 mm), to ensure the area can be chipped down to sound concrete without damage to the vertical walls or corners. Areas to be repaired shall be chipped down to sound concrete, minimum of 1-1/2 inch (38 mm), with jack hammers, 30 lbs. (14 kg) maximum, and chipping hammers, 15 lbs. (7 kg) maximum. Vertical edges and corners shall be maintained. The bottom of chipped areas shall be left rough to obtain a good bond between the patch and the old concrete. The area shall then be sandblasted, and the sand blown from the joint and the patch area.

Partially exposed dowel bars shall be coated or covered with an approved bond breaker. Improperly aligned bars shall be removed. Dowel bars, with the full length totally exposed to the removal side of the joint and below the center of the dowel, shall be cut off flush with the concrete. Dowel bars with more than 50 percent of the length exposed on both sides of the existing joint and has concrete removal below the center of the bar shall be removed.

Prior to placing the patch, the joint shall be formed to a width less than the final opening. The area shall be chipped to a uniform depth, to facilitate forming to the depth of removal or depth of dowel bars, whichever is less. Joints that are open at time of pouring due to thermal contraction shall be formed the full repair depth. Forming material shall be one unit for the length of the spall repair area.

A layer of bonding mortar shall be broomed into and over the surfaces to be patched. The patch shall be placed before the bonding mortar dries and consolidated by vibration. The patch shall be

screeded and floated from existing pavement to existing pavement. The entire width shall be straightedged. Grout shall be worked into the saw cuts extending past the corners of the spalled area. The surfaces of the patch shall be given a broomed finish.

At placement, the patch material shall be between 50° F and 90° F (10° C and 32° C) and shall be maintained above 40° F (4° C) for 72 hours. Traffic will not be permitted over the area during this period.

The patched area shall be sprayed with curing compound at a minimum rate of one gallon per 150 square feet (one Liter per 4 square meters). Joint forming material shall not be removed for 72 hours. Upon removal of the forming material, the joint shall be sawed, cleaned, and sealed.

C. Type B Spalls: The spalled concrete shall be removed and the areas chipped down to sound concrete. The resulting areas shall be left rough to obtain a good bond between patch and concrete. The area shall then be sandblasted and the joint formed as specified for Type A spalls. The entire area shall be given a coat of straight epoxy resin (without aggregates). Epoxy resin mortar shall immediately be tamped in place and troweled off. Placement of epoxy will be permitted only within the temperature range recommended in AASHTO M 235, for the class of epoxy used. Form removal, joint sawing, and traffic over the patch area will not be permitted for eight hours after placement.

D. Saw and Seal Joints: Transverse joints shall be sawed to the uniform width and depth specified. The Contractor shall have backer rod available for variable width joints up to 1-1/2 inches (38 mm) wide. Prior to sealing, the joints shall be cleaned in conformance with Section 380. Traffic will not be permitted over repair areas until joints are sealed and seal material has cured.

390.4. METHOD OF MEASUREMENT

A. Saw and Seal Joints: Saw and seal joints will be measured to the nearest foot (0.1 meter). The areas that have spall repairs will not be measured.

B. Repair of Type A Spalls: Repair of Type A spalls will be measured to the nearest 0.1 square foot (0.01 square meter). Surface measurements will be taken to the nearest 0.1 foot (0.01 meter).

C. Repair of Type B Spalls: Repair of Type B spalls will be measured to the nearest 0.1 foot (0.01 meter) or to the nearest 0.1 square foot (0.01 square meter), as shown on the plans.

390.5 BASIS OF PAYMENT

A. Saw and Seal Joints: Saw and seal joints will be paid for at the contract unit price per foot (meter). Payment will be full compensation for removal of old sealant, cleaning, and resealing the joints.

B. Repair of Type A Spalls: Repair of Type A spalls will be paid for at the contract unit price per square foot (square meter). Payment will be full compensation for sawing, sealing, materials, labor, equipment, and incidentals required.

C. Repair of Type B Spalls: Repair of Type B spalls will be paid for at the contract unit price per foot (meter) or to the nearest square foot (square meter), as shown on the plans. Payment will be full compensation for sawing, sealing, materials, labor, equipment, and all incidentals required.